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**OHIO STATE UNIVERSITY EXTENSION**

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# News

## Update on Highly Pathogenic H5 Avian Influenza Viruses

Drs. Mohamed El-Gazzar and Richard Slemons

Since December of 2014, highly pathogenic H5 avian influenza (HP H5 AI) viruses have been detected in British Columbia, Canada and Washington, Oregon, California, Utah, Idaho, and most recently Nevada within the Pacific Migratory Bird Flyway in the United States. The spread of these viruses continues to be very worrisome with additional states reporting infections every week or two. Migratory wild birds appear to be playing a prominent role in the spread of these HP H5 AI viruses. In addition to migratory birds, these viruses have been recovered from sick captive birds, backyard poultry, and from one commercial poultry flock in Canada and one commercial poultry flock in the United States.

Three different strains of influenza viruses have been detected and include: H5N1, H5N2, and H5N8. In spite of being three different virus strains the viruses appear to have similar origins related the Eurasian H5N8 influenza virus that has circulated in Asia and Europe throughout 2014. Both of the newly detected H5N2 and H5N1 viruses emerged as a mixture, having some gene segments from the Eurasian HPAI H5N8 and some gene segments from the domestic low pathogenic North American influenza viruses.

As mentioned before, migratory birds are predicted to play an important role in the spread of these viruses in the Pacific Migratory Bird Flyway. All of the Midwestern states, including the state of Ohio, are located in the Central and Mississippi migratory flyways and none of these HP H5 AIVs have been detected in any of the Midwestern states. However, many samples collected from wild birds during the recent hunting season have not yet been analyzed for the presence of AI viruses, and with hunting seasons finished, very few additional samples from wild birds will be available until next summer when live trapping is initiated at various locations (unless additional surveillance strategies are initiated). While there is no evidence that these viruses are currently circulating in the Midwest, in reality, there is little evidence at this time to indicate they do not exist in the Midwest; therefore, out of precautionary measures, we propose current **BIOSECURITY PROGRAMS BE REVIEWED FOR COMPLIANCE AND ALL NECESSARY MEASURES ARE TAKEN TO PREVENT ANY CONTACT BETWEEN DOMESTIC POULTRY/CAPTIVE BIRDS AND WILD BIRDS.**

This group of HP H5 AI viruses are highly pathogenic in poultry and apparently raptors, causing severe clinical illness inducing high mortality. This should allow for early detection

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and reporting of any infected poultry. Ducks are an exception in that regard; they show much milder, if any, clinical signs. Many Asian countries are having difficulty controlling HP H5N8 AIVs because clinical signs in domestic and wild duck populations are not easily observed or very mild allowing the infections to go undetected. This means that special attention should be paid to duck populations including wild, backyard, and commercial. Also, this is why mixed species backyard flocks, including ducks, require very careful monitoring and increased biosecurity programs. The practice of mixing poultry species is highly discouraged. On the other hand, and from all that is currently known and understood about this group of HP H5 AI viruses, they **DO NOT REPRESENT HUMAN HEALTH CONCERNS**. These strains have never been reported to infect humans, not in North America, not in Europe, nor in Asia. Therefore, **PROPERLY PREPARED POULTRY AND POULTRY PRODUCTS ARE SAFE TO CONSUME**.

While surveillance efforts are essential in planning prevention, control, and eradication strategies, they are rarely, if ever, in real time! Detection of the viruses in new geographic areas is frequently after the horse is out of the barn (in this case after the virus has been present in the area for varying lengths of time). With the possibility that these viruses could persist as HPAI viruses in wild birds and/or backyard flocks and continue to spread in North America, preventing infections in the commercial poultry, backyard poultry, and specialty birds will be dependent upon: 1) targeted active education programs, 2) instituting biosecurity protocols appropriate to address the new threat, and, 3) in the worst case scenario, have established up-to-date eradication and operating plans in the event these HP viruses gain access to commercial poultry. Also, assuring consumers that poultry products are safe to eat will also require attention.

The link below provides additional information about the current avian influenza outbreak in the US and its H5N8 Eurasian counterpart. It also offers recommendations and additional resources regarding safe handling of wild birds.:

http://www.nwhc.usgs.gov/publications/wildlife_health_bulletins/WHB_2014-05_H5N8.pdf

# Research

Cors, J. C., Gruber, A. D., Günther, R., Meyer-Kühling, B., Esser, K. H., & Rautenschlein, S. (2015). **Electroencephalographic evaluation of the effectiveness of blunt trauma to induce loss of consciousness for on-farm killing of chickens and turkeys**. *Poultry Science*. Advance online publication. doi: 10.3382/ps/peu038

**BACKGROUND:** Euthanasia of small numbers of birds in case of injury or other illness directly on the farm may be necessary for welfare reasons. This should be carried out without transportation of the moribund animals in order to minimize pain and distress. Blood loss has to be avoided to minimize the risk of contaminating the environment.

**PURPOSE:** To evaluate broilers, broiler breeders, and turkeys of different age groups and weights up to nearly 16 kg for the efficacy of blunt trauma to induce unconsciousness, allowing subsequent killing of the bird without pain. The aim was to develop a method to measure unconsciousness in poultry after headblunt trauma.

**RESULTS:** Convulsions or tonic seizures were observed in all investigated animals after blunt trauma, including strong wing movements, torticollis, and stretching of legs. The electroencephalography (EEG) results demonstrate that the blunt trauma induced by a single, sufficiently strong hit placed in the frontoparietal region of the head led to a reduction or loss of the auditory evoked potentials (AEP) in all groups of birds.

**CONCLUSIONS:** The authors concluded that the results show that blunt trauma, if done with the appropriate tool and force, is an acceptable and reliable way to induce unconsciousness under on-farm conditions in chickens and turkeys of at least up to 16 kg, which allows painless killing of these animals by cervical dislocation within 2 minutes after the onset of blunt trauma. Characteristic post-concussive convulsions and tonic seizures were observed in all animals as it was also shown previously in other studies

using comparable stunning procedures and none of the investigated birds showed regular breathing activity after blunt trauma; therefore, these parameters can be suggested as reliable indicators under field conditions for a successful stunning procedure.

**ACCESS THE ARTICLE…**

Berry, E. D., Wells, J. E., Bono, J. L., Woodbury, B. L., Kalchayanand, N., Norman, K. N., … Millner, P. D. (2015). **Effect of proximity to a cattle feedlot on *Escherichia coli* O157:H7 contamination of leafy greens and evaluation of the potential for airborne transmission**. *Applied and Environmental Microbiology, 81*(3), 1101-1110. doi: 10.1128/AEM.02998-14

**BACKGROUND:** Cattle are a significant reservoir of the zoonotic pathogen *E. coli* O157:H7, and outbreaks of *E. coli* disease linked to the consumption of spinach and lettuce have focused attention on cattle as a potential source of contamination. The significance or magnitude of the risk of transport of *E. coli* O157:H7 from animal production facilities to produce crops by wind, dust emissions, or insects is unknown. Although the airborne transport of *E. coli* has been observed, data regarding emission rates from livestock production or transport distances is limited.

**PURPOSE:** The objectives were to determine the impact of the proximity to a beef cattle feedlot on *E. coli* O157:H7 contamination of a leafy green produce crop and to evaluate the potential for airborne dissemination of *E. coli* O157:H7.

**RESULTS:** *E. coli* O157:H7 was recovered from 3.5% of leafy green samples per plot at 60 meters, which was higher than the 1.8% of positive samples per plot at 180 meters, indicating a decrease in contamination as distance from the feedlot was increased. Although *E. coli* O157:H7 was not recovered from air samples at any distance, total *E. coli* was recovered from air samples at the feedlot edge and all plot distances, indicating that airborne transport of the pathogen can occur.

**CONCLUSIONS:** Results suggest that risk for airborne transport of *E. coli* O157:H7 from cattle production is increased when cattle pen surfaces are very dry and when this situation is combined with cattle management or cattle behaviors that generate airborne dust. Current leafy green field distance guidelines of 120 meters (400 feet) may not be adequate to limit the transmission of *E. coli* O157:H7 to produce crops planted near concentrated animal feeding operations. Additional research is needed to determine safe set-back distances between cattle feedlots and crop production that will reduce fresh produce contamination.

**ACCESS THE ARTICLE…**

Ling, L. L., Schneider, T., Peoples, A. J., Spoering, A. L., Engels, I., Conlon, B. P., …Lewis, K. (2015). **A new antibiotic kills pathogens without detectable resistance**. *Nature, 517*, 455-459. doi: 10.1038/nature14098

**BACKGROUND:** Resistance development limits the useful lifespan of antibiotics and results in the requirement for a constant introduction of new compounds. Most new antibiotics were discovered by screening cultivable soil microorganisms; however, overmining of this limited resource by the 1960s brought an end to the initial era of antibiotic discovery. Approximately 99% of all species in external environments are uncultured (do not grow under laboratory conditions), and are a promising source of new antibiotics. The researchers have developed several methods to grow uncultured organisms by cultivation in their natural environment, or by using specific growth factors such as iron-chelating siderophores.

**PURPOSE:** To report the discovery of a new cell wall inhibitor, teixobactin, from a screen of uncultured bacteria grown in diffusion chambers in situ.

**CONCLUSIONS:** Teixobactin inhibits cell wall synthesis by binding to a highly conserved motif of lipid II (precursor of peptidoglycan) and lipid III (precursor of cell wall teichoic acid). The researchers did not obtain any mutants of *Staphylococcus aureus* or *Mycobacterium tuberculosis* resistant to teixobactin. The properties of this compound suggest a path towards developing antibiotics that are likely to avoid development of resistance.

**ACCESS THE ARTICLE…**

# 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/**

## Ohio Dairy Health and Management Certificate Program

Module 4 – Advanced Dairy Cattle Nutrition
March 19-21, 2015

## OEFFA Conference 2015

February 13, 2015 – Pre-Conference
**Full scholarships available for practicing veterinarians.**

Join veterinarians Dr. Päivi Rajala-Schultz and Dr. Luciana da Costa from the Department of Veterinary Preventive Medicine and Organic Valley Cooperative staff veterinarian Dr. Guy Jodarski to learn the basic requirements for good udder health, strategies for managing clinical mastitis, and more.

The *Ohio Veterinary Newsletter* began in October of 1974 as a way for Veterinary Extension to relay relevant information to practicing veterinarians in Ohio. The aim is to communicate pertinent news from the Veterinary Extension Unit; unbiased, research-based information with practical relevance for veterinary practitioners working in food animal, equine, and shelter medicine; and a calendar of upcoming opportunities. Please feel free to provide your feedback and let us know what information is most helpful to you and your practice.

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