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Isolation of H5 subtype avian influenza viruses (AIVs) from waterfowl in the upper Midwest region of the United States

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Recently, AIVs have become one of the most important zoonotic pathogens. AIVs have gained great attention and concern among the public and world healthcare professional institutions. Since its emergence in Asia in 1996, the HPAI H5N1 has crossed species boundary and now infects other host species including humans. The natural host of AIVs is waterfowl, which can transmit the virus to other hosts including domestic poultry, human, swine, equine, and canine. So far, H5 and H7 subtypes represent a potential risk to be HPAI and are, therefore, notifiable to the OIE. Thus AIV surveillance in their natural hosts is crucial to monitor and control the disease in poultry and other species. In this study, we report on the isolation of H5 subtype AIV from cloacal swabs of waterfowl captured in Minnesota, North Dakota, and South Dakota. We screened a total of 7,260 cloacal samples from waterfowl using matrix-gene-based qRT-PCR and found 148 to be positive for H5 as detected by H5 specific qRT-PCR. On inoculation of 71 samples in SPF ECEs, we could isolate H5 AIV from 25 samples. On subtyping using NA specific primers and molecular techniques of conventional RT-PCR, eight samples were found to be H5N2 while the remaining 17 samples were had a mixture of H5N1 and N2. Pathogenicity assessments were based on molecular analysis of the cleavage site of the HA gene by RT-PCR followed by sequencing. To determine the pathogenic potential of H5 AIV isolates, the HA cleavage site was amplified. The deduced amino acid sequence confirmed the isolates to be of low pathogenicity. Although, the detected H5N1 and H5N2 isolates in this study were of low pathogenicity, potential exists for them to become HPAI. This emphasizes the continuous need for an intensive AIV surveillance programs which should help in understanding the epidemiology and ecology of AIV as well as for appropriate preparedness measures to counteract future epidemics and pandemics to protect poultry industry and humans.

Biography

Dr. Sagar M. Goyal is a professor of virology at the Veterinary Diagnostic Laboratory and the department of Veterinary Population Medicine, University of Minnesota. M. El Zowalaty is a Ph D student waiting for graduation at Veterinary Diagnostic Laboratory on a scholarship to pursue doctoral research and an assistant lecturer at department of microbiology, Zagazig University, Egypt.