The urgent need for enhanced surveillance and research on avian influenza possible pandemic

Dear Editor,

Zoonotic influenza usually results from sporadic transmission from poultry to humans, but such infections are usually self-limiting. However, some strains of avian influenza viruses (AIVs), such as avian H5 and H7 viruses, are known to cause hundreds of thousands of infections with very high morbidity (30% to 50%). Therefore, some of these highly pathogenic avian influenza (HPAI) viruses have the capacity to be reproduced in humans, mediating beneficial human-to-human transmission and possible transmission, and thus pose a significant public health risk.[1] A few years after an outbreak of human HPAI H5N1 virus was reported in Hong Kong in 1997, the virus re-emerged in Asia, causing numerous deaths in poultry as well as making it difficult for humans to breathe. It is noteworthy that the Asian H5N1 influenza virus also infects and kills non-human primates and birds. These animals include large cats (tugs), domestic cats, and other felines. Thailand has reported several fatal infections caused by Asian H5N1 influenza virus in large cats (lions and leopards) as well as domestic dogs and cats.[2]

Sporadic cases of HPAI, A(H5N1) virus infections in humans, exhibiting varying levels of clinical severity and a cumulative case fatality rate exceeding 50%, have been documented in 23 countries over a span of more than 20 years. The HPAI A(H5N1) clade 2.3.4.4b viruses have undergone widespread dissemination among wild bird populations globally since around 2020–2021, resulting in outbreaks among poultry and other animal species. Recently, instances of HPAI A(H5N1) clade 2.3.4.4b viruses have been detected in dairy cows and unpasteurized milk samples across multiple U.S. states.[3] In February 2024, veterinarians were alerted to an outbreak in lactating cows in the North Texas Panhandle. Affected animals develop non-specific diseases, including reduced food intake, reduced rumination and reduced milk production. Milk from affected cows often has a thick, creamy yellow appearance, like colostrum. Milk cultures are usually negative, blood tests show mild values for aspartate aminotransferase, gamma-glutamyl transferase, creatine kinase, and bilirubin, and a complete blood count. It shows anemia and leukopenia levels.[4]

AIV surveillance has improved significantly since HPAIV H5N1 infected humans. AIVs that circulate and thrive in poultry may have the best potential for direct transmission from the chicken-human interface to the same individuals. The H3N8 G25 virus has increased binding to human receptors but low herd immunity, raising concerns about the potential for a pandemic. Dual receptor binding features and mutations associated with increased virulence and disease in animals have also been identified in many H3 AIVs. Surveillance and research on H3 avian influenza, including the use of drugs and vaccines, should be strengthened to prepare for the pandemic.[5]

Challenges such as low antibody response to AIV and diversity of AIV antigens can be overcome by developing new vaccines with broad-spectrum antibodies against AIV subtypes. The development of new vaccines is one of the most important steps in preventing such events. Antibodies produced after vaccination can be evaluated by obtaining human serum from clinical studies and testing them against selected pathogens. Since ferrets are considered the "gold standard" animal model of influenza, there is an urgent need for the development of vaccines and new tools to assess ferret immunology. The development of antibodies that are broadly cross-reactive against all IAVs of a subtype or UIV that protect against all IAV subtypes is both the intermediate and ultimate goal of vaccine research and success. Because the transmission and spread of the highly contagious influenza virus in farm animals such as cattle is not understood, further research and research into H5N1 infection in farm animals such as cattle is needed to fully understand this. their disease. We must rethink the relationship between humans, domestic animals, and wildlife to prevent the emergence of dangerous diseases that impact biodiversity and human health. The government should be responsible for protecting biodiversity and human health from diseases resulting from human activities, particularly those initiated by intensive production, such as H5N1 avian influenza. If we hope to preserve biodiversity and protect human health, we must change the way we produce food and the way we

interact with and impact wildlife.

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