

30 September 2008

This supplement has been prepared to present scientific and technical news items that may be of more interest to technical personnel at RDT&E activities and the labs, or the medics rather than the broader readership of the basic CB Daily. Due to the nature of the material, the articles, if available online, are usually only available through subscription services thus making specific links generally unavailable. Thus, usually only the bibliographic citation is available for use by an activity's technical library.

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Chem-Bio News – Pandemic Influenza Supplement #29

1. EVOLUTIONARY DYNAMICS AND EMERGENCE OF PANZOOTIC H5N1 INFLUENZA

VIRUSES: *“Our results suggest that the transmission of reassortant viruses through the mixed poultry population in farms and markets in China has selected HPAI H5N1 viruses that are well adapted to multiple hosts and reduced the interspecies transmission barrier of those viruses.”*

2. CDC AWARDS FUNDS FOR NEW PANDEMIC PLANNING APPROACHES: *“The US Centers for Disease Control and Prevention (CDC) yesterday announced the awarding of \$24 million to fund state and local projects aimed at innovative approaches to boost the nation's readiness for an influenza pandemic.”*

3. ANTIGENIC AND GENETIC CHARACTERISTICS OF H5N1 VIRUSES AND CANDIDATE H5N1 VACCINE VIRUSES DEVELOPED FOR POTENTIAL USE AS HUMAN

VACCINES: *“This summary describes the current status of the development of new candidate H5N1 vaccine viruses and is meant to provide guidance for national authorities and vaccine companies on the selection of candidate viruses for use in vaccine development.”*

4. NATURALLY OCCURRING "PROTECTIVE RNA" USED TO DEVELOP NEW ANTIVIRAL AGAINST INFLUENZA:

“Researchers from the University of Warwick, Coventry, United Kingdom have developed a new antiviral using naturally occurring influenza virus “protecting virus” that may defend against any influenza A virus in any animal host. They report their findings in the September 2008 issue of the Journal of Virology.”

5. EFFECTS OF HOP WATER EXTRACTS ON HEMAGGLUTINATION REACTION OF INFLUENZA A VIRUS AND INFLUENZA A VIRUS-INDUCED MORTALITY IN MICE:

“HWE [hop water extracts] seems to be a promising agent to prevent the influenza A virus infection.”

CB Daily Report

EVOLUTIONARY DYNAMICS AND EMERGENCE OF PANZOOTIC H5N1 INFLUENZA VIRUSES

By Dhanasekaran Vijaykrishna, Justin Bahl, Steven Riley, Lian Duan, Jin Xia Zhang, Honglin Chen, J. S. Malik Peiris, Gavin J. D. Smith, Yi Guan

PLoS Pathogens

September 29, 2008

“The highly pathogenic avian influenza (HPAI) H5N1 virus lineage has undergone extensive genetic reassortment with viruses from different sources to produce numerous H5N1 genotypes, and also developed into multiple genetically distinct sublineages in China. From there, the virus has spread to over 60 countries. The ecological success of this virus in diverse species of both poultry and wild birds with frequent introduction to humans suggests that it is a likely source of the next human pandemic. Therefore, the evolutionary and ecological characteristics of its emergence from wild birds into poultry are of considerable interest. Here, we apply the latest analytical techniques to infer the early evolutionary dynamics of H5N1 virus in the population from which it emerged (wild birds and domestic poultry). By estimating the time of most recent common ancestors of each gene segment, we show that the H5N1 prototype virus was likely introduced from wild birds into poultry as a non-reassortant low pathogenic avian influenza H5N1 virus and was not generated by reassortment in poultry. In contrast, more recent H5N1 genotypes were generated locally in aquatic poultry after the prototype virus (A/goose/Guangdong/1/96) introduction occurred, i. e., they were not a result of additional emergence from wild birds. We show that the H5N1 virus was introduced into Indonesia and Vietnam 3–6 months prior to detection of the first outbreaks in those countries. Population dynamics analyses revealed a rapid increase in the genetic diversity of A/goose/Guangdong/1/96 lineage viruses from mid-1999 to early 2000. Our results suggest that the transmission of reassortant viruses through the mixed poultry population in farms and markets in China has selected HPAI H5N1 viruses that are well adapted to multiple hosts and reduced the interspecies transmission barrier of those viruses.”

The full article can be found at: <http://www.plospathogens.org/article/info%3Adoi%2F10.1371%2Fjournal.ppat.1000161;jsessionid=ED5DAA917C6EC19DF19813BD330D7B35>

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CDC AWARDS FUNDS FOR NEW PANDEMIC PLANNING APPROACHES

By Lisa Schnirring

CIDRAP News (Center for Infectious Disease Research & Policy – University of Minnesota)

September 25, 2008

“The US Centers for Disease Control and Prevention (CDC) yesterday announced the awarding of \$24 million to fund state and local projects aimed at innovative approaches to boost the nation's readiness for an influenza pandemic.

The 1-year grants will fund 55 projects in 29 state and local health departments, according to a CDC press release. The \$24 million award pool is part of \$600 million in Public Health Emergency Preparedness (PHEP) Cooperative Agreement funding approved by Congress in 2006."

"The recipients' pandemic preparedness projects focus on seven main areas:

- * Public engagement during public health decision-making
- * Electronic exchange of laboratory data to improve influenza pandemic monitoring
- * Integration of state immunization information systems to track countermeasure distribution
- * Development of statewide electronic death reporting systems that are compatible with the Public Health Information Network
- * Coordination among healthcare providers to deliver essential services
- * Interventions to promote preparedness among vulnerable populations
- * Distribution of antiviral drugs to people who stay in their homes as a social distancing measure."

The full article can be found at: <http://www.cidrap.umn.edu/cidrap/content/influenza/panflu/news/sep2508projects-br.html>

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ANTIGENIC AND GENETIC CHARACTERISTICS OF H5N1 VIRUSES AND CANDIDATE H5N1 VACCINE VIRUSES DEVELOPED FOR POTENTIAL USE AS HUMAN VACCINES

World Health Organization

September 2008

"This summary describes the current status of the development of new candidate H5N1 vaccine viruses and is meant to provide guidance for national authorities and vaccine companies on the selection of candidate viruses for use in vaccine development. The selection of H5N1 vaccine viruses should consider the geographical spread, epidemiology, and antigenic and genetic properties of recently circulating H5N1 viruses.

Clinical trials using both clade 1 and clade 2 viruses should continue as an essential element in pandemic preparedness."

The full report can be found at: http://www.who.int/entity/csr/disease/avian_influenza/guidelines/200809_H5VaccineVirusUpdate.pdf

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NATURALLY OCCURRING "PROTECTIVE RNA" USED TO DEVELOP NEW ANTIVIRAL AGAINST INFLUENZA

Life Science News

September 28, 2008

"Researchers from the University of Warwick, Coventry, United Kingdom have developed a new antiviral using naturally occurring influenza virus "protecting virus" that may defend against any influenza A virus in any animal host. They report their findings in the September 2008 issue of the Journal of Virology."

"The "protecting virus" contains an altered gene that makes it harmless and prevents it from reproducing in a cell. If another influenza virus invades the cell it still remains harmless, but rapidly reproduces and prevents infection by literally crowding out the new influenza strain."

The full article can be found at: <http://news.biocompare.com/newsstory.asp?id=246228>

The original article can be found at: (N.J. Dimmock, E.W. Rainsford, P.D. Scott, A.C. Marriot. 2008. Influenza virus protecting RNA: an effective prophylactic and therapeutic antiviral. Journal of Virology, 82. 17: 8570-8578.). Link not available.

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EFFECTS OF HOP WATER EXTRACTS ON HEMAGGLUTINATION REACTION OF INFLUENZA A VIRUS AND INFLUENZA A VIRUS-INDUCED MORTALITY IN MICE

Science Letter

September 30, 2008

"In this study, the inhibitory effect of hop water extract (HWE) on influenza A virus infection was examined by the hemagglutination inhibition (HI) test, inhibition of virus growth in MDCK cells (in vitro) and the morbidity and mortality of mice after nasal infection of the virus (in vivo). HWE significantly inhibited the hemagglutination of influenza A virus at a total polyphenol concentration of 0.6 mg/ml."

"HWE-pretreated influenza A virus could not infect MDCK cells. The 50% tissue culture infectious dose (TCID₅₀) of HWE was 28.6 µg/ml. Furthermore, a treatment of 50 mg/ml of HWE for influenza A virus significantly inhibited the mortality of mice against nasal infection with influenza A virus. HWE exerted an inhibitory effect against viral infection by inhibiting the binding of hemagglutinins of Flu and the sialic acid-containing glycoproteins of epithelial cells."

"HWE seems to be a promising agent to prevent the influenza A virus infection."

The full article can be found at: (S. Segawa, et. al., "Effects of hop water extracts on hemagglutination reaction of influenza A virus and influenza A virus-induced mortality in mice". Food Science and Technology Research, 2008; 14(4):409-414). Link not available.

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