

20 April 2010

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 Edition #108

1. GUILLAIN-BARRÉ SYNDROME CASES LOW AFTER 2009 H1N1 VACCINE: *"A new study finds that reports of a neurologic disease called Guillain-Barré syndrome (GBS) have been low after 2009 H1N1 vaccination, according to a research study that will be presented as part of the late-breaking science program at the American Academy of Neurology's 62nd annual meeting in Toronto, April 10-17, 2010. The study is one of the first national reports of the occurrence of GBS after 2009 H1N1 vaccination."*

2. CHICKEN ANTIBODIES MAY HELP PREVENT H5N1 PANDEMIC: *"Scientists have discovered for the first time that antibodies in common eggs laid by hens vaccinated against the H5N1 virus can potentially prevent a possible H5N1 pandemic, raising the possibility that the same principle could be applied to the current H1N1 influenza pandemic."*

3. ASSESSMENT OF SEASONAL INFLUENZA A VIRUS-SPECIFIC CD4 T-CELL RESPONSES TO 2009 PANDEMIC H1N1 SWINE-ORIGIN INFLUENZA A VIRUS: *"These findings suggest that without protective antibody responses, individuals vaccinated against seasonal influenza A may still benefit from preexisting cross-reactive memory CD4 T cells reducing their susceptibility to S-OIV infection."*

4. RISK OF SEVERE OUTCOMES AMONG PATIENTS ADMITTED TO HOSPITAL WITH PANDEMIC (H1N1) INFLUENZA: *"The risk of a severe outcome was elevated among those who had an underlying medical condition and those 20 years of age and older. A delay of one day in the median time between the onset of symptoms and admission to hospital increased the risk of death by 5.5%."*

5. RESPONSE OF BALB/C MICE TO A MONOVALENT INFLUENZA A (H1N1) 2009 SPLIT VACCINE: *"A preliminary safety evaluation showed that the vaccine was not toxic at large doses (0.5 ml containing 60 microg HA+600 microg Al(OH)(3) or 60 microg HA). Moreover, the vaccine was found to be safe at a dose of 120 microg HA+1200 microg Al(OH)(3) or 120 microg HA in 1.0 ml in rats."*

6. ROLE OF SECONDARY SIALIC ACID BINDING SITES IN INFLUENZA N1 NEURAMINIDASE: *"Our results indicate possible lowered HA activity for this secondary sialic acid site. which may be an important event in the emergence of the current pandemic"*

strain."

CB Daily Report

Chem-Bio News

GUILLAIN-BARRÉ SYNDROME CASES LOW AFTER 2009 H1N1 VACCINE

Infection Control Today Magazine

April 13, 2010

"A new study finds that reports of a neurologic disease called Guillain-Barré syndrome (GBS) have been low after 2009 H1N1 vaccination, according to a research study that will be presented as part of the late-breaking science program at the American Academy of Neurology's 62nd annual meeting in Toronto, April 10-17, 2010. The study is one of the first national reports of the occurrence of GBS after 2009 H1N1 vaccination."

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"Scientists analyzed information obtained from the Centers for Disease Control and Prevention (CDC) and Food and Drug Administration Vaccine Adverse Event Reporting System (VAERS) and found that there were 35 reports of GBS following 2009 H1N1 vaccination around the country by the end of the year 2009. This amounts to 3.5 reports of GBS per 10 million people vaccinated. All cases of GBS except one were reported within six weeks of vaccination, with 23 cases reported within the first two weeks after vaccine administration. One report of death and one of disability were reported in the 33 patients who were hospitalized."

The full article can be found at: <http://www.infectioncontroltoday.com/hotnews/guillain-barre-syndrome-h1n1-vaccine.html>

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CHICKEN ANTIBODIES MAY HELP PREVENT H5N1 PANDEMIC

Infection Control Today Magazine

April 19, 2010

"Scientists have discovered for the first time that antibodies in common eggs laid by hens vaccinated against the H5N1 virus can potentially prevent a possible H5N1 pandemic, raising the possibility that the same principle could be applied to the current H1N1 influenza pandemic."

A team of scientists led by Dr. Huan Huu Nguyen at the International Vaccine Institute (IVI) and those at the U.S. Centers for Disease Control and Prevention tested the efficacy of the avian antibodies against both influenza viruses H5N1 and H1N1 in mice. Chicken antibodies found in egg yolk had been used mainly for treatment of gastrointestinal infections.

"Our tests show proof-of-concept that antibodies, or the antiviral proteins 'immunoglobulins Y (IgY),' found in consumable eggs laid by vaccinated hens may be an affordable, safe, and effective alternative for the control of influenza outbreaks, including the current H1N1 pandemic," said Dr. Huan Huu Nguyen, an immunologist at the IVI and the lead author of the study, which was published in the April 13 issue of PLoS ONE.

The scientists isolated H5N1-specific antibodies from consumers' eggs sold in Vietnam, where hens are vaccinated against the pathogen, and tested them against infections with H5N1 and related H5N2 strains in mice. When delivered into the nose before infection, the antibodies from the egg yolk prevented the infection. When administered after infection, the same antibodies reduced the severity of the infection, enabling mice to recover from the disease.

The chicken antibodies could be administered as a nasal spray. This form of 'passive vaccination' could also be applied to prevent disease caused by the current pandemic H1N1, using egg yolk antibodies from hens vaccinated against the H1N1 virus.

"This study provides a rational basis for the use of passive immunization as an adjunct strategy for early intervention against pandemic influenza, especially in countries that have implemented mass vaccination of poultry," said Dr. Cecil Czerkinsky, deputy director-general of the IVI."

The full article can be found at: <http://www.infectioncontrolday.com/hotnews/chicken-antibodies-prevent-h5n1-pandemic.html>

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ASSESSMENT OF SEASONAL INFLUENZA A VIRUS-SPECIFIC CD4 T-CELL RESPONSES TO 2009 PANDEMIC H1N1 SWINE-ORIGIN INFLUENZA A VIRUS

Biotech Week
April 14, 2010

"Very limited evidence has been reported to show human adaptive immune responses to the 2009 pandemic H1N1 swine-origin influenza A virus (S-OIV). We studied 17 S-OIV peptides homologous to immunodominant CD4 T epitopes from hemagglutinin (HA), neuraminidase (NA), nuclear protein (NP), M1 matrix protein (MP), and PB1 of a seasonal H1N1 strain."

"We concluded that 15 of these 17 S-OIV peptides would induce responses of seasonal influenza virus-specific T cells. Of these, seven S-OIV sequences were identical to seasonal influenza virus sequences, while eight had at least one amino acid that was not conserved. T cells recognizing epitopes derived from these S-OIV antigens could be detected ex vivo. Most of these T cells expressed memory markers, although none of the donors had been exposed to S-OIV. Functional analysis revealed that specific amino acid differences in the sequences of these S-OIV peptides would not affect or partially affect memory T-cell responses."

"These findings suggest that without protective antibody responses, individuals vaccinated against seasonal influenza A may still benefit from preexisting cross-reactive memory CD4 T cells reducing their susceptibility to S-OIV infection."

The full article can be found at: (X. Ge, et. al., "Assessment of seasonal influenza A virus-specific CD4 T-cell responses to 2009 pandemic H1N1 swine-origin influenza A virus". Journal of Virology, 2010;84(7):3312-9). Link not available.

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RISK OF SEVERE OUTCOMES AMONG PATIENTS ADMITTED TO HOSPITAL WITH PANDEMIC (H1N1) INFLUENZA

Medical Letter on the CDC & FDA

April 11, 2010

"We describe the disease characteristics and outcomes, including risk factors for admission to intensive care unit (ICU) and death, of all patients in Canada admitted to hospital with pandemic (H1N1) influenza during the first five months of the pandemic. We obtained data for all patients admitted to hospital with laboratory-confirmed pandemic (H1N1) influenza reported to the Public Health Agency of Canada from Apr. 26 to Sept. 26, 2009."

"We compared inpatients who had nonsevere disease with those who had severe disease, as indicated by admission to ICU or death. A total of 1479 patients were admitted to hospital with confirmed pandemic (H1N1) influenza during the study period. Of these, 1171 (79.2%) did not have a severe outcome, 236 (16.0%) were admitted to ICU and survived, and 72 (4.9%) died. The median age was 23 years for all of the patients, 18 years for those with a nonsevere outcome, 34 years for those admitted to ICU who survived and 51 years for those who died. The risk of a severe outcome was elevated among those who had an underlying medical condition and those 20 years of age and older. A delay of one day in the median time between the onset of symptoms and admission to hospital increased the risk of death by 5.5%. The risk of a severe outcome remained relatively constant over the five-month period. The population-based incidence of admission to hospital with laboratory-confirmed pandemic (H1N1) influenza was low in the first five months of the pandemic in Canada."

The full article can be found at: (A. Campbell, et. al., "Risk of severe outcomes among patients admitted to hospital with pandemic (H1N1) influenza". Canadian Medical Association Journal, 2010;182(4):349-355). Link not available.

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RESPONSE OF BALB/C MICE TO A MONOVALENT INFLUENZA A (H1N1) 2009 SPLIT VACCINE

World Disease Weekly

April 13, 2010

"In this study, we developed a monovalent influenza A (H1N1) split vaccine and evaluated its effects in BALB/c mice. Mice were immunized subcutaneously with 2 doses of the vaccine containing hemagglutinin (HA) alone or HA plus an aluminum hydroxide (Al(OH)₃) adjuvant. Immunization with varying doses of HA (3.75, 7.5, 15, 30, 45 or 60 microg) was performed to induce the production of neutralizing antibodies. The vaccine elicited strong hemagglutination inhibition (HI) and microneutralization, and addition of the adjuvant augmented the antibody response. A preliminary safety evaluation showed that the vaccine was not toxic at large doses (0.5 ml containing 60 microg HA+600 microg Al(OH)₃ or 60 microg HA). Moreover, the vaccine was found to be safe at a dose of 120 microg HA+1200 microg Al(OH)₃ or 120 microg HA in 1.0 ml in rats."

The full article can be found at: (P. Yang, et. al., "Response of BALB/c mice to a monovalent influenza A (H1N1) 2009 split vaccine". Cellular & Molecular Immunology, 2010;7(2):116-22). Link not available.

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ROLE OF SECONDARY SIALIC ACID BINDING SITES IN INFLUENZA N1 NEURAMINIDASE

Health & Medicine Week

April 19, 2010

"Within influenza viral particles, the intricate balance between host cell binding and sialic acid receptor destruction is carefully maintained by the hemagglutinin (HA) and neuraminidase (NA) glycoproteins, respectively. A major outstanding question in influenza biology is the function of a secondary sialic acid binding site on the NA enzyme."

"Through a series of Brownian dynamics (BD) simulations of the avian N1, human pandemic N2, and currently circulating pandemic (H1)N1 enzymes, we have probed the role of this secondary sialic acid binding site in the avian N1 subtype. Our results suggest that electrostatic interactions at the secondary and primary sites in avian NA may play a key role in the recognition process of the sialic acid receptors and catalytic efficiency of NA. This secondary site appears to facilitate the formation of complexes with the NA protein and the sialic acid receptors, as well as provide HA activity to a lesser extent. Moreover, this site is able to steer inhibitor binding as well, albeit with reduced capacity in N1, and may have potential implications for drug resistance of optimal inhibitor design. Although the secondary sialic acid binding site has previously been shown to be nonconserved in swine NA strains, our investigations of the currently circulating pandemic H1N1 strain of swine origin appears to have retained some of the key features Of the Secondary sialic acid binding site."

"Our results indicate possible lowered HA activity for this secondary sialic acid site. which may be an important event in the emergence of the current pandemic strain."

The full article can be found at: (J.C. Sung, et. al., "Role of Secondary Sialic Acid Binding Sites in Influenza N1 Neuraminidase". Journal of the American Chemical Society, 2010;132(9):2883+). Link not available.

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