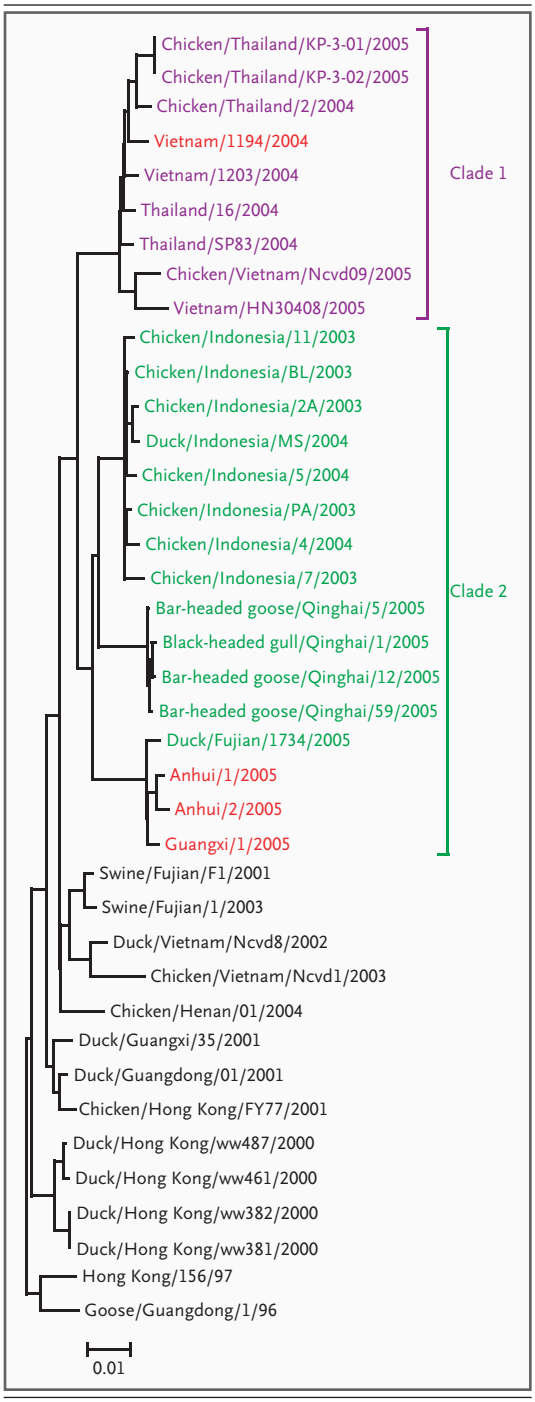

Figure 1. Phylogram Showing the Genetic Relationships among Representative Strains of the Hemagglutinin Gene.

The phylogenic tree displays the genetic relatedness of influenza A (H5N1) strains isolated from animals and humans. The phylogram shows nucleotide positions 29 through 1732 (1704 bp); the scale bar indicates 0.01 nucleotide change per site. Anhui/1/2005 is the virus isolated from the pregnant woman reported here. A/Vietnam/1194/2004 and A/Vietnam/1203/2004 are vaccine strains under development. Clades 1 and 2 designate clusters of genetically related viruses. The absence of a leading animal designation implies human origin of the isolate. The strains discussed here are highlighted in red.

tions of influenza and should be considered for vaccination.[1,2] The genetic diversity of H5N1 influenza strains causing serious human disease is greater than previously recognized. These observations have important implications for vaccine development, since the vaccine strains being developed include A/Vietnam/1194/2004 (in China) and A/Vietnam/1203/2004,[3] which belongs to clade 1.

Yuelong Shu, Ph.D.

State Key Laboratory of Infectious Disease Prevention and Control
Beijing 100052, China
yshu@vip.sina.com

Hongjie Yu, M.D., M.P.H.

Chinese Center for Disease Control and Prevention
Beijing 100050, China

Dexin Li, M.D.

National Institute for Viral Disease Control and Prevention
Beijing 100052, China

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Influenza Vaccination and False Positive HIV Results

TO THE EDITOR: Six weeks after an occupational needle-stick injury, a 35-year-old man presented to a clinic in the Los Angeles area for testing to rule out acute infection with the human immunodeficiency virus (HIV). The patient had no other risk factors for HIV infection and reported having had no symptoms suggestive of an acute retroviral syndrome. His recent medical history was notable only for his having received an influenza vaccination 11 days before presentation.

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His test for hepatitis C antibody was negative, but an enzyme immunoassay for HIV type 1 (HIV-1) was repeatedly reactive, and the result on a Western blot assay that was performed as part of the clinical protocol to confirm a reactive enzyme immunoassay was indeterminate, with a single band that was positive for glycoprotein 160 (GP160). An HIV nucleic acid amplification test was ordered to rule out cross-reactivity caused by the influenza vaccination; the patient's viral load was undetectable by this method. In accordance with accepted screening algorithms,[1] we thus considered the patient to be HIV-negative with a high level of confidence. At one month, his viral load remained undetectable (<50 copies per milliliter), and the results on Western blotting had reverted to nonreactive.

A case–control study[2] of 101 blood donors who had been vaccinated against influenza and 191 matched controls showed that recent inoculation with any brand of influenza vaccine was significantly associated with a false positive screening assay for HIV antibodies. Guidelines of both Johns Hopkins and the New York State Department of Health list influenza vaccination as a known cause of indeterminate results on Western blotting for HIV antibodies.[3] Furthermore, digital reconstructions of both molecules demonstrate a striking homology between the transmembrane domains of HIV-1 envelope proteins and the influenza envelope protein hemagglutinin, although whether this homology accounts for the false positive assay reactions is unclear.[4]

The HIV GP160 protein exists only in the intracellular domain, where it is cleaved into GP41 and GP120 oligomers. Since GP160 itself is not present in mature HIV virions,[5] GP160 proteins and antibodies against these proteins should be absent not only from the Western blot assays but also in most cases from the serum of HIV-infected patients.

Given the escalating international awareness of various influenza strains, it is very important to remind patients and clinicians that influenza vaccination may cause cross-reactivity with HIV antibody assays. The time course for such cross-reactivity remains uncertain. Moreover, if the screening algorithm for acute HIV infection had called for the use of a nucleic acid amplification test instead of the Western blot assay to confirm the enzyme immunoassay, the index patient would not have received an indeterminate result.

Christian P. Erickson, M.D.
USHealthworks
Los Angeles, CA 90245
christianerickson@alumni.duke.edu

Todd McNiff, M.D., M.S.P.H.
Mount Sinai Medical Center
Miami Beach, FL 33140

Jeffrey D. Klausner, M.D., M.P.H.
San Francisco Department of Public Health
San Francisco, CA 94103

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Oseltamivir Resistance in Influenza A (H5N1) Infection

TO THE EDITOR: De Jong et al. (Dec. 22 issue)[1] report resistance to oseltamivir in two of three recent deaths from influenza A (H5N1) virus infection and recommend investigation into new antiviral drugs for use either alone or in combination with oseltamivir. Zanamivir is another licensed neuraminidase inhibitor. Studies with nebulized and intravenous preparations suggest that zanamivir has good safety and efficacy, even in patients with underlying respiratory disease.[2-4] The H274Y mutation that confers resistance to oseltamivir inpatients with H5N1 infection does not confer cross-resistance to zanamivir, a phenomenon attributable to differences in binding properties.[5] A treatment regimen combining these two neuraminidase inhibitors would be expected to reduce the opportunity for the selection of resistant mutants, in a manner akin to the use of dual nucleoside analogues in antiretroviral therapy.

Ravindra K. Gupta, M.P.H., M.R.C.P.
Jonathan S. Nguyen-Van-Tam, M.B.E., D.M.
Health Protection Agency
London NW9 5HT, United Kingdom

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