

New research shows how H5N1 virus causes disease

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H5N1 influenza, also known as avian influenza, is considered a major global threat to human health, with high fatality rates. While little had been known about the specific effects of H5N1 on organs and cells targeted by the virus, researchers at Beijing University, Columbia University Mailman School of Public Health, and SUNY Downstate report in the September 29, 2007 issue of the *Lancet* detailed studies of human H5N1 victims that shed light on the anatomic distribution of the virus and its pathogenesis.

Using a combination of molecular and protein labeling techniques, the authors found that H5N1 is present in the gastrointestinal tract and immune and central nervous systems, as well as the respiratory tract. In one patient, virus was transmitted across the placenta to the fetus.

The newly obtained data are important in the clinical, pathological, and epidemiological investigations of human H5N1 infection, and have widespread implications for public-health and healthcare providers. Although there has been considerable progress in studying the virus itself, and in developing surveillance networks, diagnostic tests, drugs and vaccines, only limited information has been obtained concerning the mechanisms by which H5N1 causes disease.

H5N1 infections initially seemed to be restricted to the lungs, but later reports have suggested that influenza A H5N1 could disseminate beyond the lungs. Lung damage is severe and disproportionate to the number of cells that are infected, with macrophages and T-cells targeted for

infection. These latest findings indicate that lung damage is not due to virus replication alone and support the hypothesis that indirect effects, such as soluble factors known as cytokine and chemokines, are important.

According to the paper's senior author W. Ian Lipkin, MD, director of the Center for Infection and Immunity at Columbia University Mailman School of Public Health and professor of Epidemiology, Neurology, and Pathology at Columbia, "This is the first major paper from the Beijing Infectious Disease Center, established in the aftermath of SARS by Beijing University, the Chinese Ministry of Science and Technology (the CDC of China), and the Mailman School of Public Health. The work helps us to understand H5N1's high fatality rate, as well as serving as model for global collaboration in the field of emerging infectious diseases."

Source: Columbia University's Mailman School of Public Health

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