

# Of swine, birds and men -- pandemic H1N1 flu

February 1 2010

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Current research suggests that pandemic H1N1 influenza of swine origin has distinct means of transmission from the seasonal flu, yet does not result in the pathogenic severity of avian flu viruses. The related report by Chan et al, "Tropism and Innate Host Responses of the 2009 Pandemic H1N1 Influenza Virus in ex Vivo and in Vitro Cultures of Human Conjunctiva and Respiratory Tract," appears published online ahead of print in the April 2010 issue of *The American Journal of Pathology*.

Pandemic H1N1 influenza of swine origin is a novel influenza strain that causes a generally mild respiratory illness, but results in severe disease or death in vulnerable individuals. The [World Health Organization](#) reports that "as of 17 January 2010, worldwide more than 209 countries and overseas territories or communities have reported laboratory confirmed cases of [pandemic](#) influenza H1N1 2009, including at least 14142 deaths." High risk groups include the very young and old, people with compromised immune systems, and pregnant women.

Unlike [seasonal flu](#), which only infects cells located in the nose and the throat, pandemic H1N1 can replicate efficiently in cells deeper in the lung, similar to the more pathogenic H5N1 'bird flu'. Researchers led by Drs. Michael C.W. Chan and Joseph S.Malik Peiris at Queen Mary Hospital, Hong Kong SAR, China compared the cell infection pattern and immune responses of pandemic H1N1 to seasonal flu as well as to highly pathogenic avian influenza strains. They found that in contrast to seasonal flu, pandemic H1N1 and highly pathogenic avian flu could

infect the conjunctiva, a membrane that lines the eyelids and covers the white part of the eye, suggesting an additional route of transmission as well as differences in receptor binding profile. However, pandemic H1N1 did not differ from seasonal flu either in replication in nose, throat, and lung cells or in induction of an inflammatory immune response, which is dysregulated in high pathogenic [avian flu](#) infections. Taken together, these results are consistent with epidemiological data that suggest that while pandemic H1N1 has subtle differences in transmissibility and pathogenesis from seasonal flu, it does not induce as severe disease as [bird flu](#) viruses.

Chan et al conclude that "the pandemic [H1N1 virus] (but not the seasonal virus) infects conjunctival epithelium, suggest[ing] that the eye may be an important route for acquiring infection with [pandemic H1N1] as compared with seasonal influenza viruses. Furthermore, this observation implies important differences in receptor preference and tissue tropism between the pandemic H1N1 and seasonal influenza viruses, which may have relevance in pathogenesis. ... [However,] the 2009 pandemic H1N1 influenza virus is comparable with seasonal influenza in inducing host innate responses and does not have the intrinsic properties of cytokine dysregulation possessed by [the highly pathogenic avian influenza] virus or the 1918 pandemic H1N1 [influenza virus](#)." "While generally mild in the majority of cases, the pandemic H1N1 virus is not just another seasonal flu virus and has subtle peculiarities of its own". Future studies using host-gene expression profiling of virus infected respiratory cells using microarrays are in progress to further investigate the pathogenesis of this virus.

**More information:** Chan MCW, Chan RWY, Yu WCL, Ho CCC, Yuen KM, Fong JHM, Tang LLS, Lai WW, Lo ACY, Chui WH, Sihoe ADL, Kwong DLW, Wong DSH, Tsao GSW, Poon LLM, Guan Y, Nicholls JM, Peiris JSM: Tropism and Innate Host Responses of the 2009 Pandemic H1N1 Influenza Virus in ex Vivo and in Vitro Cultures

of Human Conjunctiva and Respiratory Tract. Am J Pathol 176.  
[DOI:10.2353/ajpath.2010.091087](https://doi.org/10.2353/ajpath.2010.091087)

Provided by American Journal of Pathology

Citation: Of swine, birds and men -- pandemic H1N1 flu (2010, February 1) retrieved 3 January 2023 from <https://medicalxpress.com/news/2010-02-swine-birds-men-pandemic.html>

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