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Avian and swine influenza viruses: our current understanding of the zoonotic risk

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Abstract

The introduction of swine or avian influenza (AI) viruses in the human population can set the stage for a pandemic, and many fear that the Asian H5N1 AI virus will become the next pandemic virus. This article first compares the pathogenesis of avian, swine and human influenza viruses in their natural hosts. The major aim was to evaluate the zoonotic potential of swine and avian viruses, and the possible role of pigs in the transmission of AI viruses to humans. Cross-species transfers of swine and avian influenza to humans have been documented on several occasions, but all these viruses lacked the critical capacity to spread from human-to-human. The extreme virulence of H5N1 in humans has been associated with excessive virus replication in the lungs and a prolonged overproduction of cytokines by the host, but there remain many questions about the exact viral cell and tissue tropism. Though pigs are susceptible to several AI subtypes, including H5N1, there is clearly a serious barrier to infection of pigs with such viruses. AI viruses frequently undergo reassortment in pigs, but there is no proof for a role of pigs in the generation of the 1957 or 1968 pandemic reassortants, or in the transmission of H5N1 or other wholly avian viruses to humans. The major conclusion is that cross-species transmission of influenza viruses per se is insufficient to start a human influenza pandemic and that animal influenza viruses must undergo dramatic but largely unknown genetic changes to become established in the human population.

Key words:

influenza / birds / pigs / pathogenesis / zoonosis



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