Comparative Pathogenesis of an Avian H5N2 and a Swine H1N1 Influenza Virus in Pigs -

Comparative Pathogenesis of an Avian H5N2 and a Swine H1N1 Influenza Virus in Pigs

Pigs are considered intermediate hosts for the transmission of avian influenza viruses (AIVs) to humans but the basic organ pathogenesis of AIVs in pigs has been barely studied. We have used 42 four-week-old influenza naive pigs and two different inoculation routes (intranasal and intratracheal) to compare the pathogenesis of a low pathogenic (LP) H5N2 AIV with that of an H1N1 swine influenza virus. The respiratory tract and selected extra-respiratory tissues were examined for virus replication by titration, immunofluorescence and RT-PCR throughout the course of infection. Both viruses caused a productive infection of the entire respiratory tract and epithelial cells in the lungs were the major target. Compared to the swine virus, the AIV produced lower virus titers and fewer antigen positive cells at all levels of the respiratory tract. The respiratory part of the nasal mucosa in particular showed only rare AIV positive cells and this was associated with reduced nasal shedding of the avian compared to the swine virus. The titers and distribution of the AIV varied extremely between individual pigs and were strongly affected by the route of inoculation. Gross lung lesions and clinical signs were milder with the avian than with the swine virus, corresponding with lower viral loads in the lungs. The brainstem was the single extra-respiratory tissue found positive for virus and viral RNA with both viruses. Our data do not reject the theory of the pig as an intermediate host for AIVs, but they suggest that AIVs need to undergo genetic changes to establish full replication potential in pigs. From a biomedical perspective, experimental LP H5 AIV infection of pigs may be useful to examine heterologous protection provided by H5 vaccines or other immunization strategies, as well as for further studies on the molecular pathogenesis and neurotropism of AIVs in mammals.

General information
Publication status: Published
Organisations: Sektion for Eksotiske Virussygdomme, Division of Virology, National Veterinary Institute, Ghent University, Veterinary & Agrochemical Research Centre
Contributors: De Vleeschauwer, A., Atanasova, K., Van Borm, S., van den Berg, T., Rasmussen, T. B., Uttenthal, Å., Van Reeth, K.
Pages: e6662
Publication date: 2009
Peer-reviewed: Yes

Publication information
Journal: P L o S One
Volume: 4
Issue number: 8
ISSN (Print): 1932-6203
Ratings:
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 2.614 SNIP 1.056
Web of Science (2009): Indexed yes
Original language: English
Keywords: Avian influenza virus, swine influenza virus, PriProET
Electronic versions:
journal.pone.0006662.pdf
DOI:
10.1371/journal.pone.0006662

Bibliographical note
This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.
Source: orbit
Source-ID: 249978
Research output: Contribution to journal › Journal article – Annual report year: 2009 › Research › peer-review