



Genetic and antigenic characterization of influenza A virus circulating in Danish swine during the past decade

Fobian, Kristina; Kirk, Isa Kristina; Breum, Solvej Østergaard; Lewis, Nicola; Hjulsager, Charlotte Kristiane; Larsen, Lars Erik

Publication date:
2013

[Link back to DTU Orbit](#)

Citation (APA):

Fobian, K., Kirk, I. K., Breum, S. Ø., Lewis, N., Hjulsager, C. K., & Larsen, L. E. (2013). *Genetic and antigenic characterization of influenza A virus circulating in Danish swine during the past decade*. Abstract from Influenza2013, Oxford, United Kingdom.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Genetic and antigenic characterization of influenza A virus circulating in Danish swine during the past decade.

Kristina Fobian^{1*}, Isa Kirk², Solvej Breum¹, Nicola Lewis³, Charlotte Hjulsager¹, Lars E. Larsen¹

¹National Veterinary Institute, Technical University of Denmark, Bülowsvej 27, 1870 Frederiksberg C, Denmark.

²DTU Systems Biology, Søløfts Plads, Building 221, 2800 Kgs. Lyngby, Denmark.

³Department of Zoology, University of Cambridge, Downing Street, Cambridge, CB2 3EJ, United Kingdom.

*Corresponding author: Kristina Fobian, Tel: +45 35886606 Email: krfob@vet.dtu.dk

Influenza A virus has been endemic in Danish swine for the last 30 years, with H1N1 and H1N2 being the dominating subtypes. The purpose of this study was to investigate the genetic and antigenic evolution of the influenza viruses found in Danish swine during the last 10 years. A total of 78 samples were isolated in MDCK cells, RNA extracted and the hemagglutinin and neuraminidase genes full length sequenced. In addition, the isolates were tested in hemagglutination inhibition (HI) tests against a panel of known antisera raised against a range of European swine influenza virus isolates. Phylogenetic analysis of the HA and NA genes revealed continuous evolutionary drift as expected for RNA viruses with low mutational selection pressure. Estimated selection pressures indicated that more purifying and less diversifying selection controlled the H1 evolution. The mean rates of synonymous and non-synonymous substitutions for H1, N1 and N2 were found to be in agreement with previously observed values for Eurasian swine lineages. Calculation of possible glycosylation sites in the hemagglutinin gene revealed that the H1N2 and H1N1 subtypes had three well conserved glycosylation sites in common. The results of the HI tests were analysed by antigenic cartography to quantify the antigenic relationship between the virus isolates. The antigenic cartography map showed that most of the Danish viruses were antigenic very similar, with only a few outliers. In conclusion, this study provided an important contribution to the complex epidemiology of circulating swine influenza virus in Denmark and indicates that vaccine development targeted against Danish H1N1 and H1N2 need only to include few components for the induction of cross protection against the predominant strains.

The study was supported by grants from "European surveillance network for influenza in pigs (ESNIP) 3" (<http://www.esnip3.eu>) and The Danish Veterinary and Food Administration.

Email: krfob@vet.dtu.dk

Email: isa@cbs.dtu.dk

Email: sbre@vet.dtu.dk

Email: nsl25@cam.ac.uk

Email: ckhj@vet.dtu.dk

Keywords: Swine influenza, phylogeny, antigenic cartography