

Project 3: Thirty-pig pathogenesis study with 2009 A/H1N1 influenza virus isolates from California and Mexico

Purpose of study: To address whether meat, blood and tissue from pigs infected with pandemic 2009 H1N1 Influenza A Virus is free of infectious virus.

Experiment:

- Thirty 5-week-old cross-bred pigs from a herd free of swine influenza virus (SIV) and porcine reproductive and respiratory syndrome virus (PRRSV) were housed in containment facilities and cared for in compliance with the Institutional Animal Care and Use Committee of the National Animal Disease Center (NADC).
- Fifteen pigs were inoculated intra-tracheally either with an infective dose of the 2009 H1N1 Influenza A virus isolated from persons in California (A/CA/04/2009) or Mexico (A/Mexico/4108/2009). The viral isolates were kindly provided by the Centers for Disease Control and Prevention (CDC).
- Pigs were observed daily for clinical signs of disease. Pigs were humanely euthanized on 3, 5, and 7 days post-infection (dpi). Five non-challenged, age-matched control pigs were necropsied at 7 dpi. Fresh samples were taken from lung, tonsil, inguinal lymph node, liver, spleen, kidney, skeletal muscle (*semitendinosus*), and colon contents (feces), and examined using both real time RT-PCR and virus isolation (VI) techniques, which are the most sensitive and specific tools to detect the presence of viral nucleic acid and live virus, respectively.

Results:

- Inoculated pigs demonstrated typical influenza-like illness, while sham-inoculated controls remained free of influenza virus.
- Tissues outside the respiratory tract were found to be negative by VI at 3, 5, and 7 dpi. Only respiratory tract samples were positive by both methods (real time RT-PCR and VI) on days 3 and 5 dpi.

Conclusion: The 2009 pandemic H1N1 virus can induce respiratory disease in swine that is consistent with influenza illness. However, there is no evidence that systemic infections occur and that meat is contaminated with infectious virus. The findings reported in this study support the WHO recommendation that pork harvested from swine previously-infected and recovered from pandemic influenza A/H1N1 would be safe to handle and consume when following normal meat hygiene practices. Pandemic 2009 A/H1N1 Influenza A virus was only detected in tissues associated with the respiratory tract of infected pigs and the virus does not appear to spread and replicate in other tissues based on 3, 5, and 7 days post-infection samples.

Research Article:

Absence of 2009 Pandemic H1N1 Influenza A Virus in Fresh Pork