



Pork Information Gateway



## Research Project: SUSCEPTIBILITY OF SWINE TO HIGHLY PATHOGENIC AVIAN INFLUENZA VIRUSES

Location: [Virus and Prion Diseases of Livestock](#)

Title: *Experimental Infection of Pigs with the 1918 Pandemic Influenza Virus*

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**Technical Abstract:** Swine influenza was first recognized as a disease during the 1918 "Spanish flu" pandemic suggesting the Spanish flu virus caused swine influenza. The objective of this study was to determine the susceptibility of swine to the Spanish flu virus. A plasmid-derived 1918 pandemic H1N1 (1918/rec) influenza virus was rescued and the pathogenicity of this virus in swine was compared to a plasmid-derived A/swine/Iowa/15/1930 H1N1 virus (1930/rec), the first isolated influenza virus. Four-week-old piglets were inoculated intratracheally with either the 1930/rec or the 1918/rec virus, or intranasally with the 1918/rec virus. A transient increase in body temperature and mild respiratory signs developed post challenge in all inoculation groups. In contrast to other mammalian hosts (mice, ferrets and macaques), where infection with the 1918/rec virus was lethal, the pigs did not develop severe respiratory distress or become moribund. Virus titers in the lower respiratory tract as well as macro- and microscopic lesions at 3 and 5 days post infection (dpi) were comparable between the 1930/rec and 1918/rec virus-inoculated animals. In contrast to the 1930/rec infected animals, at 7 dpi prominent lung lesions were still present in the 1918/rec infected animals. Moreover, microscopic lesions were still detected out to 20 dpi in this group. This data supports the hypothesis that the 1918 pandemic influenza virus was able to infect and replicate in swine causing a respiratory disease, and it was likely introduced into pigs during the 1918 pandemic resulting in the current lineage of the classical H1N1 swine influenza viruses



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**Interpretive Summary:** Pigs are susceptible to infection with influenza viruses from birds and people. Swine influenza was first recognized as a disease during the 1918 "Spanish flu" pandemic suggesting the Spanish flu virus caused swine influenza. The goal of this work was to determine the susceptibility of swine to the Spanish flu virus. Through molecular genetic techniques, the 1918 Spanish flu virus was created. The ability of this virus to cause disease in swine was compared to 1930 swine flu virus, the first influenza virus ever isolated. Previous studies have demonstrated the 1930 swine virus was genetically similar to the 1918 Spanish flu virus. Four-week-old piglets were inoculated intratracheally with either the 1930 swine virus or the Spanish flu virus, or intranasally with the Spanish flu virus. A transient increase in body temperature and mild respiratory signs developed post challenge in all inoculation groups. In contrast to other mammalian hosts (mice, ferrets and macaques), where infection with the Spanish flu virus was lethal, the pigs did not develop severe respiratory distress or become moribund. In this study the acute phase of the infection was similar between the 1930 swine flu Spanish flu groups. However, during the convalescent phase it took longer for the pigs to clear the Spanish flu infection when compared to the 1930 swine flu infection. This data supports the assumption that the 1918 pandemic influenza was able to infect and replicate in swine causing a respiratory disease, and the virus was likely introduced into pigs during the 1918 pandemic resulting in the current lineage of the classical H1N1 swine influenza viruses.

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