Experimental Infection of Pigs with the Human 1918 Pandemic Influenza Virus

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Swine influenza was first recognized as a disease entity during the 1918 "Spanish flu" pandemic. The aim of this work was to determine the virulence of a plasmid-derived human 1918 pandemic H1N1 influenza virus (reconstructed 1918, or 1918/rec, virus) in swine using a plasmid-derived A/swine/Iowa/15/1930 H1N1 virus (1930/rec virus), representing the first isolated influenza virus, as a reference. 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 temperature and mild respiratory signs developed postinoculation in all virus-inoculated 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 postinfection (dpi) were comparable between the 1930/rec and 1918/rec virus-inoculated animals. In contrast to the 1930/rec virus-infected animals, at 7 dpi prominent lung lesions were present in only the 1918/rec virus-infected animals, and all the piglets developed antibodies at 7 dpi. Presented data support the hypothesis that the 1918 pandemic influenza virus was able to infect and replicate in swine, causing a respiratory disease, and that the virus was likely introduced into the pig population during the 1918 pandemic, resulting in the current lineage of the classical H1N1 swine influenza viruses.

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