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Experimental Infection of Pigs with the Human 1918 Pandemic Influenza Virus

Hana M. Weingartl,[1,2*] Randy A. Albrecht,[3] Kelly M. Lager,[4] Shawn Babiuk,[1,5] Peter Marszal,[1] James Neufeld,[1] Carissa Embury-Hyatt,[1] Porntippa Lekcharoensuk,[4,10] Terrence M. Tumpey,[6] Adolfo García-Sastre,[3,7,8] and Jürgen A. Richt[4,9*]

National Centre for Foreign Animal Disease, Canadian Food Inspection Agency, Winnipeg, Manitoba, Canada,[1] Department of Medical Microbiology,[2] Department of Immunology, University of Manitoba, Winnipeg, Manitoba, Canada,[5] Department of Microbiology,[3] Department of Medicine, Division of Infectious Diseases,[7] Emerging Pathogens Institute, Mount Sinai School of Medicine New York, New York,[8] National Animal Disease Center, ARS-USDA, Ames, Iowa,[4] Centers for Disease Control and Prevention, Influenza Division, Atlanta, Georgia,[6] Kansas State University, College of Veterinary Medicine, Manhattan, Kansas,[9] Department of Microbiology and Immunology, Faculty of Veterinary Medicine, Kasetsart University, Bangkok, Thailand,[10]

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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.

* Corresponding author. Mailing address for Hana M. Weingartl: National Center for Foreign Animal Disease, Canadian Food Inspection Agency, 1015 Arlington St., Winnipeg, Manitoba R3E 3M4, Canada. Phone: (204) 789 2027. Fax: (204) 789-2038. E-mail: hweingartl@inspection.gc.ca . Mailing address for Jürgen A. Richt: College of Veterinary Medicine, K224B Mossier Hall, Kansas State University, Manhattan, KS 66506. Phone: (785) 532-2793. Fax: (785) 532-4039. E-mail: jricht@vet.k-state.edu

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