

Pause on Avian Flu Transmission Research

Ron A. M. Fouchier,^{1*} Adolfo García-Sastre,² Yoshihiro Kawaoka,³ Wendy S. Barclay,⁴ Nicole M. Bouvier,⁵ Ian H. Brown,⁶ Iliaria Capua,⁷ Hualan Chen,⁸ Richard W. Compans,⁹ Robert B. Couch,¹⁰ Nancy J. Cox,¹¹ Peter C. Doherty,¹² Ruben O. Donis,¹³ Heinz Feldmann,¹⁴ Yi Guan,¹⁵ Jaqueline Katz,¹⁶ H. D. Klenk,¹⁷ Gary Kobinger,¹⁸ Jinhua Liu,¹⁹ Xiufan Liu,²⁰ Anice Lowen,²¹ Thomas C. Mettenleiter,²² Albert D. M. E. Osterhaus,²³ Peter Palese,²⁴ J. S. Malik Peiris,²⁵ Daniel R. Perez,²⁶ Jürgen A. Richt,²⁷ Stacey Schultz-Cherry,²⁸ John Steel,²⁹ Kanta Subbarao,³⁰ David E. Swayne,³¹ Toru Takimoto,³² Masato Tashiro,³³ Jeffery K. Taubenberger,³⁴ Paul G. Thomas,³⁵ Ralph A. Tripp,³⁶ Terrence M. Tumpey,³⁷ Richard J. Webby,³⁸ Robert G. Webster³⁹

¹Department of Virology, Erasmus MC, 3000CA Rotterdam, 3015GE Rotterdam, Netherlands. ²Department of Microbiology, Mount Sinai School of Medicine, New York, NY 10029, USA. ³Department of Pathobiological Sciences, School of Veterinary Medicine, University of Wisconsin-Madison, Madison, WI 53711, USA. ⁴Department of Medicine, Imperial College, London, UK. ⁵Division of Infectious Diseases and Department of Microbiology, Mount Sinai School of Medicine, New York, NY 10029, USA. ⁶Virology Department, Animal Health and Veterinary Laboratories Agency, Addlestone, KT15, UK. ⁷Istituto Zooprofilattico Sperimentale delle Venezie, 35020, Padova, Italy. ⁸Harbin Veterinary Research Institute, CAAS, Harbin 150001, China. ⁹Influenza Pathogenesis and Immunology Research Center, Emory University, School of Medicine, Atlanta, GA 30322, USA. ¹⁰Department of Molecular Virology and Microbiology, Baylor College of Medicine, Houston, TX 77030, USA. ¹¹Centers for Disease Control and Prevention, Influenza Division, Atlanta, GA 30333, USA. ¹²Department of Immunology, St. Jude Children's Research Hospital, Memphis TN 38105, USA. ¹³Molecular Virology and Vaccines Branch, Influenza Division, Centers for Disease Control and Prevention, Atlanta, GA 30333, USA. ¹⁴Laboratory of Virology, National Institute of Allergy and Infectious Diseases, National Institutes of Health, Rocky Mountain Laboratories, Hamilton, MT 59840, USA. ¹⁵State Key Laboratory of Emerging Infectious Diseases, The University of Hong Kong, Hong Kong SAR. ¹⁶Immunology and Pathogenesis Branch, Influenza Division, Centers for Disease Control and Prevention, Atlanta, GA 30333, USA. ¹⁷Institut für Virologie, 35043 Marburg, Germany. ¹⁸National Microbiology Laboratory, Public Health Agency of Canada, Winnipeg, Manitoba R3E 3R2, Canada. ¹⁹Department of Preventative Veterinary Medicine, China Agricultural University, Beijing, China. ²⁰Animal Infectious Disease Laboratory, School of Veterinary Medicine, Yangzhou University, Yangzhou, Jiangsu 225009, China. ²¹Department of Microbiology and Immunology, Emory University School of Medicine, Atlanta, GA 30322, USA. ²²Friedrich-Loeffler-Institut, D-17493 Greifswald-Insel Riems, Germany. ²³Department of Virology, Erasmus MC, Rotterdam, Netherlands. ²⁴Department of Microbiology, Mount Sinai School of Medicine, New York, NY 10029-6574, USA. ²⁵Department of Microbiology and HKU-Pasteur Research Centre, The University of Hong Kong, Pokfulam, Hong Kong SAR. ²⁶Department of Veterinary Medicine, University of Maryland, College Park, College Park, MD 20742, USA. ²⁷College of Veterinary Medicine, Kansas State University, Manhattan, KS 66506, USA. ²⁸Department of Infectious Diseases, St. Jude Children's Research Hospital, Memphis, TN 38105, USA. ²⁹Department of Microbiology and Immunology, Emory University, School of Medicine, Atlanta, GA 30322, USA. ³⁰Emerging Respiratory Viruses Section, Laboratory of Infectious Diseases, National Institute of Allergy and Infectious Diseases, National Institutes of Health, Bethesda, MD 20892-3203, USA. ³¹Southeast Poultry Research Laboratory, USDA/Agricultural Research Service, Athens, GA 30605, USA. ³²Department of Microbiology and Immunology, University of Rochester Medical Center, Rochester, NY 14642, USA. ³³National Institute of Infectious Diseases, Influenza Virus Research Center, Tokyo, 208-001, Japan. ³⁴Viral Pathogenesis and Evolution Section, Laboratory of Infectious Diseases, National Institute of Allergy and Infectious Diseases, National Institutes of Health, Bethesda, MD 20892-3203 USA. ³⁵Department of Immunology, St. Jude Children's Research Hospital, Memphis, TN 38105-3678, USA. ³⁶Department of Infectious Diseases, College of Veterinary Medicine, University of Georgia, Athens, GA 30602, USA. ³⁷Influenza Division, Centers for Disease Control and Prevention, Atlanta, GA 30333, USA. ³⁸Department of Infectious Diseases, St. Jude Children's Research Hospital, Memphis, TN 38105-3678, USA. ³⁹Division of Virology, Department of Infectious Diseases, St. Jude Children's Research Hospital, Memphis, TN 38105, USA.

*To whom correspondence should be addressed. E-mail: r.fouchier@erasmusmc.nl

The continuous threat of an influenza pandemic represents one of the biggest challenges in public health. Influenza pandemics are known to be caused by viruses that evolve from animal reservoirs, such as in birds and pigs, and can acquire genetic changes that increase their ability to transmit in humans. Pandemic preparedness plans have been implemented worldwide to mitigate the impact of influenza pandemics. A major obstacle in preventing influenza

pandemics is that little is known regarding what makes an influenza virus transmissible in humans. As a consequence, the potential pandemic risk associated with the many different influenza viruses of animals cannot be assessed with any certainty.

Recent research breakthroughs identified specific determinants of transmission of H5N1 influenza viruses in ferrets. Responsible research on influenza virus transmission

using different animal models is conducted by multiple laboratories in the world using the highest international standards of biosafety and biosecurity practices that effectively prevent the release of transmissible viruses from the laboratory. These standards are regulated and monitored closely by the relevant authorities. This statement is being made by the principal investigators of these laboratories. In two independent studies conducted in two leading influenza laboratories at the University of Wisconsin–Madison and Erasmus MC in Rotterdam, the Netherlands, investigators have proved that viruses possessing a haemagglutinin (HA) protein from highly pathogenic avian H5N1 influenza viruses can become transmissible in ferrets. This is critical information that advances our understanding of influenza transmission. However, more research is needed to determine how influenza viruses in nature become human pandemic threats, so that they can be contained before they acquire the ability to transmit from human to human, or so that appropriate countermeasures can be deployed if adaptation to humans occurs.

Despite the positive public health benefits these studies sought to provide, a perceived fear that the ferret-transmissible H5 HA viruses may escape from the laboratories has generated intense public debate in the media on the benefits and potential harm of this type of research. We would like to assure the public that these experiments have been conducted with appropriate regulatory oversight in secure containment facilities by highly trained and responsible personnel to minimize any risk of accidental release. Whether the ferret-adapted influenza viruses have the ability to transmit from human to human cannot be tested. We recognize that we and the rest of the scientific community need to clearly explain the benefits of this important research and the measures taken to minimize its possible risks. We propose to do so in an international forum in which the scientific community comes together to discuss and debate these issues. We realize that organizations and governments around the world need time to find the best solutions for opportunities and challenges that stem from the work. To provide time for these discussions, we have agreed on a voluntary pause of 60 days on any research involving highly pathogenic avian influenza H5N1 viruses leading to the generation of viruses that are more transmissible in mammals. In addition, no experiments with live H5N1 or H5 HA reassortant viruses already shown to be transmissible in ferrets will be conducted during this time. We will continue to assess the transmissibility of H5N1 influenza viruses that emerge in nature and pose a continuing threat to human health.

19 January 2012; accepted 20 January 2012

Published online 20 January 2012;

10.1126/science.1219412

Comment on this article at <http://scim.ag/zr4XKx> .

Pause on Avian Flu Transmission Research

Ron A. M. Fouchier, Adolfo García-Sastre, Yoshihiro Kawaoka, Wendy S. Barclay, Nicole M. Bouvier, Ian H. Brown, Ilaria Capua, Hualan Chen, Richard W. Compans, Robert B. Couch, Nancy J. Cox, Peter C. Doherty, Ruben O. Donis, Heinz Feldmann, Yi Guan, Jacqueline Katz, H. D. Klenk, Gary Kobinger, Jinhua Liu, Xiufan Liu, Anice Lowen, Thomas C. Mettenleiter, Albert D. M. E. Osterhaus, Peter Palese, J. S. Malik Peiris, Daniel R. Perez, Jürgen A. Richt, Stacey Schultz-Cherry, John Steel, Kanta Subbarao, David E. Swayne, Toru Takimoto, Masato Tashiro, Jeffery K. Taubenberger, Paul G. Thomas, Ralph A. Tripp, Terrence M. Tumpey, Richard J. Webby and Robert G. Webster

published online January 20, 2012

ARTICLE TOOLS

<http://science.sciencemag.org/content/early/2012/01/20/science.1219412>

PERMISSIONS

<http://www.sciencemag.org/help/reprints-and-permissions>

Use of this article is subject to the [Terms of Service](#)