

# **Protection of Mice and Poultry from Lethal H5N1 Avian Influenza Virus through Adenovirus-Based Immunization**

*Wentao Gao,<sup>1</sup> Adam C. Soloff,<sup>4</sup> Xiuhua Lu,<sup>5</sup> Angela Montecalvo,<sup>1</sup> Doan C. Nguyen,<sup>5</sup> Yumi Matsuoka,<sup>5</sup> Paul D. Robbins,<sup>2</sup> David E. Swayne,<sup>6</sup> Ruben O. Donis,<sup>5</sup> Jacqueline M. Katz,<sup>5</sup> Simon M. Barratt-Boyes,<sup>4</sup> and Andrea Gambotto<sup>1,2,3\*</sup>*

*Departments of Surgery,<sup>1</sup> Molecular Genetics and Biochemistry,<sup>2</sup> Medicine, Division of Infectious Diseases, University of Pittsburgh School of Medicine, Pittsburgh, Pennsylvania 15261,<sup>3</sup> Department of Infectious Diseases and Microbiology, Graduate School of Public Health, University of Pittsburgh, Pittsburgh, Pennsylvania 15261,<sup>4</sup> Influenza Branch, National Center for Infectious Diseases, Centers for Disease Control and Prevention, Atlanta, Georgia 30333,<sup>5</sup> Southeast Poultry Research Laboratory, Agricultural Research Service, U.S. Department of Agriculture, Athens, Georgia 30605<sup>6</sup>*

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The recent emergence of highly pathogenic avian influenza virus (HPAI) strains in poultry and their subsequent transmission to humans in Southeast Asia have raised concerns about the potential pandemic spread of lethal disease. In this paper we describe the development and testing of an adenovirus-based influenza A virus vaccine directed against the hemagglutinin (HA) protein of the A/Vietnam/1203/2004 (H5N1) (VN/1203/04) strain isolated during the lethal human outbreak in Vietnam from 2003 to 2005. We expressed different portions of HA from a recombinant replication-incompetent adenoviral vector, achieving vaccine production within 36 days of acquiring the virus sequence. BALB/c mice were immunized with a prime-boost vaccine and exposed to a lethal intranasal dose of VN/1203/04 H5N1 virus 70 days later. Vaccination induced both HA-specific antibodies and cellular immunity likely to provide heterotypic immunity. Mice vaccinated with full-length HA were fully protected from challenge with VN/1203/04. We next evaluated the efficacy of adenovirus-based vaccination in domestic chickens, given the critical role of fowl species in the spread of HPAI worldwide. A single subcutaneous immunization completely protected chickens from an intranasal challenge 21 days later with VN/1203/04, which proved lethal to all control-vaccinated chickens within 2 days. These data indicate that the rapid production and subsequent administration of recombinant adenovirus-based vaccines to both birds and high-risk individuals in the face of an outbreak may serve to control the pandemic spread of lethal avian influenza.

*\* Corresponding author. Mailing address: Departments of Surgery and Medicine, Division of Infectious Diseases, University of Pittsburgh School of Medicine, Molecular Medicine Institute, Suite 412, 300 Technology Drive, Pittsburgh, PA 15219. Phone: (412) 383-7684. Fax: (412) 383-9760. E-mail: [agamb@pitt.edu](mailto:agamb@pitt.edu).*

*These authors contributed equally to this work.*

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