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An H5N1 based matrix protein 2 ectodomain tetrameric peptide vaccine provided cross-protection against lethal infection of H7N9 influenza virus

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Since March 2013, a novel avian influenza A H7N9 virus has emerged in China and resulted in 458 confirmed infection cases and 177 deaths. The virus contained several human adaptation markers which implied that it might cause outbreaks or even pandemic in the public. The outbreak of this new influenza virus has highlighted the need for the development of universal influenza vaccines. Previously, we have demonstrated that a tetrameric peptide vaccine based on the matrix protein 2 ectodomain (M2e) of H5N1 virus (H5N1-M2e), could protect mice from lethal infection with different clades of H5N1 and 2009 pandemic H1N1 influenza viruses. In this study, we investigated the cross-protection of H5N1-M2e against lethal infection of the new H7N9 virus. Although five amino acid differences existed at positions 13, 14, 18, 20 and 21 between M2e of H5N1 and H7N9, our results showed that H5N1-M2e vaccination with either Freund's adjuvant or Sigma Adjuvant System (SAS) could still induce high level of anti-M2e antibody, which could cross-react with H7N9-M2e peptide. A mouse adapted H7N9 strain A/Anhui/01/2013m was used for lethal challenge in animal experiments. H5N1-M2e vaccination provided potent cross-protection against lethal challenge of H7N9 virus. Reduced viral replication and histopathological damage of mouse lungs were also observed in the vaccinated mice. Our results suggested that the tetrameric H5N1-M2e peptide vaccine could protect different subtypes of influenza virus infections. It thus may be an ideal candidate for universal vaccine development in order to prevent the re-emergence of avian influenza A H7N9 virus and the emergence of potential novel reassortants of influenza virus.

Biography

Bo-Jian Zheng has completed his PhD in 1990 from the University of Hong Kong and Postdoctoral studies in 1993 from McMaster University. He is a Professor working on Virology and Immunology in Department of Microbiology, The University of Hong Kong. He has published more than 180 peer-reviewed papers in international journals and has been serving as an Editorial Board Member of several journals.

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