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Preparation for potential pandemic influenza through vaccination

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Abstract

The frequent evolution of influenza viruses allows them to escape immunity induced by annual influenza vaccination. This escape is made possible by point mutations occurring around the conserved receptor binding site of HA protein. Sometimes, reassortment of HA among different influenza virus subtypes, or antigenic shift, results in a new influenza virus subtype for which our human population lacks protective immunity and can consequently lead to a new influenza pandemic. The pandemic 2009 H1N1 influenza painfully highlighted that the development of a matching vaccine is a time consuming process, and in many countries, vaccines did not become available until after the peak of the pandemic. The rapid dissemination of the 2009 pandemic influenza viruses and the potential transmission of H5N1 and H7N9 viruses in humans also underscore the urgent need for universal influenza vaccines that elicit cross-immunity against different influenza virus strains. We have adapted two approaches to generate cross-strain immunity against influenza viruses. First, we used prime-boost immunization with currently licensed live attenuated influenza vaccine (LAIV); second, we generated chimeric universal influenza antigens which could target more conserved epitopes on influenza hamaglutanin and marix protein 2. Both approaches have shown promise in eliciting cross-strain protective immunity against influenza in mouse model of influenza infection. It is expected that a universal influenza vaccine approach would be the best option for preparation against future influenza pandemics.

Biography

Mingtao Zeng, Ph.D., is currently a tenured Associate Professor at Texas Tech University Health Sciences Center. He has spent the last 15 years to develop new generation vaccines against respiratory pathogens such as influenza viruses and *Streptococcus pneumoniae* as well as agents important for biodefense such as *Bacillus anthracis* and botulinum neurotoxins, *Francisella tularensis*. Dr. Zeng has served as members of numerous grant review committees for National Institute of Health (NIH) and Department of Defense (DOD) in the field of microbial vaccine research. He has been members of editorial board for 7 international journals and reviewed manuscripts for many journals.