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## Activation of protective innate-adaptive immunity duo for conferring rapid-sustained-broad protection of vaccines against influenza

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We report that intranasal administration of an E1/E3-defective ( $\Delta$ E1E3) adenovirus serotype 5 (Ad5)-vectored influenza vaccine could induce seroconversion in human volunteers without appreciable adverse effects, even in subjects with pre-existing Ad5 immunity. Mice and ferrets were well protected against challenge by a lethal dose of an H5N1 avian influenza virus following intranasal instillation of an Ad5 vector encoding hemagglutinin (HA) in a single-dose regimen. Moreover, the  $\Delta$ E1E3 Ad5 particle itself without transgene could confer rapid-sustained-broad protection against influenza by inducing an anti-influenza state in a drug-like manner, conceivably by activating a specific arm of innate immunity. An Ad5 vector encoding HA thus consolidates drug and vaccine into a single package, which allows the Ad5 backbone to induce protective innate immunity capable of conferring nearly-immediate and prolonged (e.g., 5 hours to 47 days) protection as the first wave against influenza; followed by HA-mediated adaptive immunity as the second wave before the innate immunity-associated anti-influenza state declines away. Overall, the work conceivably would foster the development of a novel noninvasive drug-vaccine duo platform technology capable of conferring rapid-sustained-broad protection against pathogens with neither the potential to induce drug resistance nor that to trigger harmful systemic inflammation.

### Biography

De-chu Christopher Tang is the Founder of VaxDome LLC and Vaxin Inc. He obtained his PhD in Microbiology from Indiana University in 1989. He carried out his Postdoctoral work at Baylor College of Medicine, Duke University, and University of Texas Southwestern Medical Center. He joined the faculty at University of Alabama at Birmingham (UAB) in 1994; subsequently founded Vaxin Inc. on UAB campus in 1997; and was responsible for Vaxin's daily operation as the Chief Scientific Officer until 2012. He was one of the pioneers during the development of DNA vaccines, noninvasive skin-patch vaccines, adenovirus-vectored nasal vaccines, adenovirus-vectored poultry vaccines, as well as the protective innate-adaptive immunity duo platform technology. He received the Wallace H. Coulter Award for innovation and entrepreneurship in 2000; and Vaxin Inc. was selected as a Tech Museum Awards Laureate in 2007. He was selected as a Distinguished Overseas Scientist by the South Korea KOFST Brain Pool Program in 2012; subsequently joined Chung-Ang University and IVI in Seoul; and was appointed as a Scientist at IVI after the Brain Pool Program Award expired in 2013. He founded VaxDome LLC in Birmingham, Alabama, USA in 2014.

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