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Rational design for next generation pandemic influenza vaccines

Influenza pandemics can spread quickly and cost millions of lives; the 2009 H1N1 pandemic highlighted the shortfall in the current vaccine strategy and the need for an improved global response in terms of shortening the time required to manufacture the vaccine and increasing production capacity. We have developed an entirely bacterially produced recombinant influenza vaccine based on the E. coli-produced hemagglutinin globular head domain covalently linked to virus-like particles derived from the bacteriophage Qbeta. Immunization of mice, induced functional antibody titers comparable to the licensed 2009 H1N1 pandemic vaccine Panvax, and significantly reduced viral titers in the lung following viral challenge. Furthermore the vaccine induced T-helper type 1 responses defined by influenza-specific interferon- γ producing CD4+ T cells and IgG2a antibody production. In ferrets the vaccine elicited neutralizing antibodies, and reduced viral titers and morbidity following challenge. A Phase I clinical evaluation of the vaccine has been performed with all individuals profiled for global gene expression, expansion of antigen-specific T cells and hemagglutinin inhibition titers. The data from this clinical evaluation will be presented and compared to a small cohort of individuals who received the licensed influenza vaccine and underwent similar immunological profiling.

Biography

Connolly is a Senior Principal Investigator and Director for Translational Immunology at the Institute of Molecular and Cellular Biology (IMCB). Additionally, Dr. Connolly serves as Program Director for the A*Star Program in Translational Research in Infectious Disease (<http://www.a-star.edu.sg/aspire>), a multi-disciplinary center focused on target discovery and vaccine development. His research interests focus on rational vaccine design. He is an Adjunct Associate Professor of Immunology at Baylor University. Dr. Connolly received his Ph.D. in Immunology from Dartmouth Medical School and studied human dendritic cell biology under Dr. Michael Fanger. During this time he was involved in the development of immunotherapeutic preclinical models and clinical trials for Glioblastoma multiforme (GBM). He moved to the Baylor Institute for Immunology Research, a fully translational research institute dedicated to rationally designed vaccines against cancer and infectious disease. Dr. Connolly served as the Director of Research Initiatives for the Baylor Research Institute, leading a large integrated translational research resource and multi-institutional programs that involved a number of international sites. During his tenure at Baylor, Dr. Connolly was the central core facility director of the NIAID Centers for Translational Research on Human Immunology and Biodefense, an NIH funded consortium of basic, translational research and clinical trials focused on vaccine design.

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