

4th International Conference on **Nanotek & Expo**

December 01-03, 2014 DoubleTree by Hilton Hotel San Francisco Airport, USA

DNA Vaccine that target hemagglutinin to MHC II-molecules rapidly induces antibody-mediated protection against influenza

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New influenza A viruses with pandemic potential periodically emerge due to viral genomic reassortment. In the face of pandemic threats, production of conventional egg-based vaccines is time consuming and of limited capacity. We have now developed a novel DNA vaccine where viral hemagglutinin (HA) is bivalently targeted to Major Histocompatibility Complex (MHC) class II molecules on antigen presenting cells (APCs). Following DNA vaccination, transfected cells secreted vaccine proteins that bound MHC II on APCs and initiated adaptive immune responses. A single DNA immunization induced within 8 days protective levels of strain-specific antibodies, and also cross-reactive T cells. During the Mexican flu pandemic, a targeted DNA vaccine (HA from A/California/07/2009) was generated within 3 weeks after the HA sequences were published online. These results suggest that MHC II-targeted DNA vaccines could play a role in situations of pandemic threats. The vaccine principle should be extendable to other infectious diseases.

Biography

Bjarne Bogen is Professor of Immunology at the University of Oslo, Norway. He is Director of K.G. Jebsen Centre for Research on Influenza Vaccines. He has been member of the Basel Institute for Immunology (1985-86) and visiting Professor at Stanford University School of Medicine (1996-97) and Harvard University (2004-05). One of his research interests is development of novel DNA vaccines (Vaccibodies) that target vaccine proteins to antigen presenting cells. Based on patent applications on Vaccibodies, a company (Vaccibody) has been established, he is head of the scientific panel of the company.

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