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Protection against influenza from RNActive® technology

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Abstract

Messenger RNA based vaccination is a novel and promising vaccination approach. In recent years CureVac has developed RNActive® technology providing highly effective two-component mRNA-based vaccines with self adjuvanting activity. Recently, very promising results were generated RNActive® vaccines in the field of cancer immunotherapy in preclinical and clinical settings. Therefore, we wanted to investigate the use of RNActive® technology to generate vaccines protecting against infectious diseases, using influenza virus infection as an example.

Experiments conducted on mice showed that an mRNA vaccine based on the influenza hemagglutinin (HA) elicited outstanding protective efficacy against challenge infections. It was possible to demonstrate this protective efficacy for several human strains of influenza (H1N1, H3N2) and for highly pathogenic H5N1 viruses when the corresponding hemagglutinin was part of the mRNA vaccine (homologous protection). Serum transfers to non-immunized animals showed that this protection mechanism is elicited by antibodies. Moreover, when the conserved nucleoprotein of the influenza virus was used as a vaccine antigen, it was possible to induce protective efficacy not only against the homologous strain of influenza, but also against challenge infection with a heterologous H5N1 virus. These results are extremely promising as regards the pursuit of innovative RNActive® vaccines for seasonal influenza and potential new approaches in the area of vaccination against infectious diseases in general

Biography

Dr. Benjamin Petsch, Head of Vaccines at CureVac GmbH, Benjamin Petsch joined CureVac in 2010 as a Scientist in the vaccines department developing mRNA based vaccines against infectious diseases. He received his university degree from University of Munich and performed his doctoral thesis at the Friedrich-Loeffler-Institut, Tübingen, where he continued as a postdoc and research group leader working on mRNA vaccination against Influenza and on intervention of Influenza replication using small molecules.