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Characterization of the expression of avian influenza virus hemagglutinin H5 by different recombinant Newcastle disease viruses

*Eylin Topfstedt (1), °Angela Römer-Oberdörfer (1), Jutta Veits (1), Berd Koellner (2), Thomas C. Mettenleiter (1)

(1) Institute of Molecular Biology, Friedrich-Loeffler-Institute, Greifswald-Insel Riems, Germany; (2) Institute of Infectiology, Friedrich-Loeffler-Institute, Greifswald-Insel Riems, Germany

Avian influenza virus (AIV) and Newcastle disease virus (NDV), two of the great variety of potencially pathoagenic agents for chickens and other poultry, cause severe disease of birds and result in great losses in economy. By using the system of reverse genetics, we recently developed NDV into a viral vector for expression of AIV proteins, in particular hemagglutinin (H), to produce a live attenuated virus able to protect poultry simultaneously against both diseases. Moreover, AIV hemagglutinin-expressing NDV allows easy mass administration of an anti-AIV vaccine and the opportunity to differentiate vaccinated and AIV infected animals by their antibody profile (DIVA). To characterize and optimise expression of the AIV transgene, recombinant NDV carrying the AIV H5 gene from the German AIV H5N1 isolate Ruegen R65/06 at different integration sites within the NDV genome were constructed by reverse genetics. Data are presented on the characterization of the resulting recombinant vector viruses and the influence of the integration site on transgene expression taking into account the differential transcription of genes in a 3'-5' gradient.
Recombinant viruses were characterized by ICPI, indirect immunofluorescence, replication studies and Western blot analysis. First results indicated that moving the H5 ORF to a more upstream position does indeed increase transcription and protein synthesis from the transgene. Higher expression levels of AIV H5 should result in a better immune response against AIV of chickens especially under field conditions, e.g. in the presence of maternal antibodies against the NDV vector virus.

Corresponding author:
Römer-Oberdörfer, Angela
Angela.Roemer-Oberdoerfer@fli.bund.de
Phone: ++49 383517107
Fax: ++49 383517275